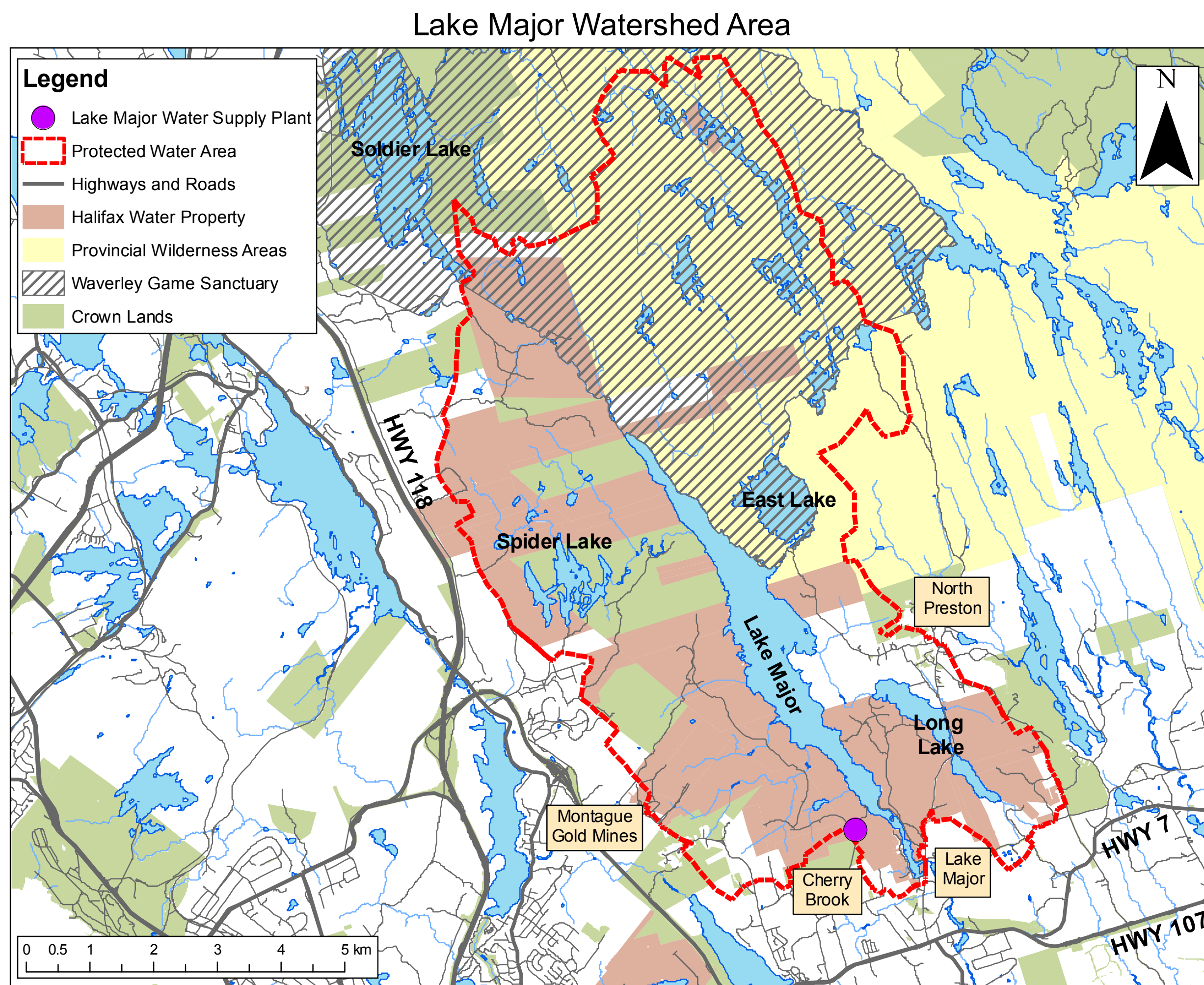


# LAKE MAJOR DAM REPLACEMENT

## GENERAL INFORMATION - LAKE MAJOR DAM



\* This map is for informational purposes only and should not be used for legal, engineering, or surveying purposes.

### CONTEXT

- The Lake Major Watershed provides water to Dartmouth, Cole Harbour, Eastern Passage, Westphal and North Preston.
- It encompasses about 7,000 hectares (70 km<sup>2</sup>) and is designated as a protected water area under the Nova Scotia Environment Act and Lake Major Protected Water Area Regulations.

### LAKE MAJOR DAM

- The lake/reservoir level, and therefore water supply, is controlled by the Lake Major dam, located near the south end of the lake.
- The Water Utility assumed ownership of the Lake Major dam in 1960. Lake Major took over from Lake Lamont as the primary source of water for the Dartmouth System.
- The Lake Major Water Supply Plant was constructed in 1999.

### LAKE MAJOR DAM REPLACEMENT PROJECT

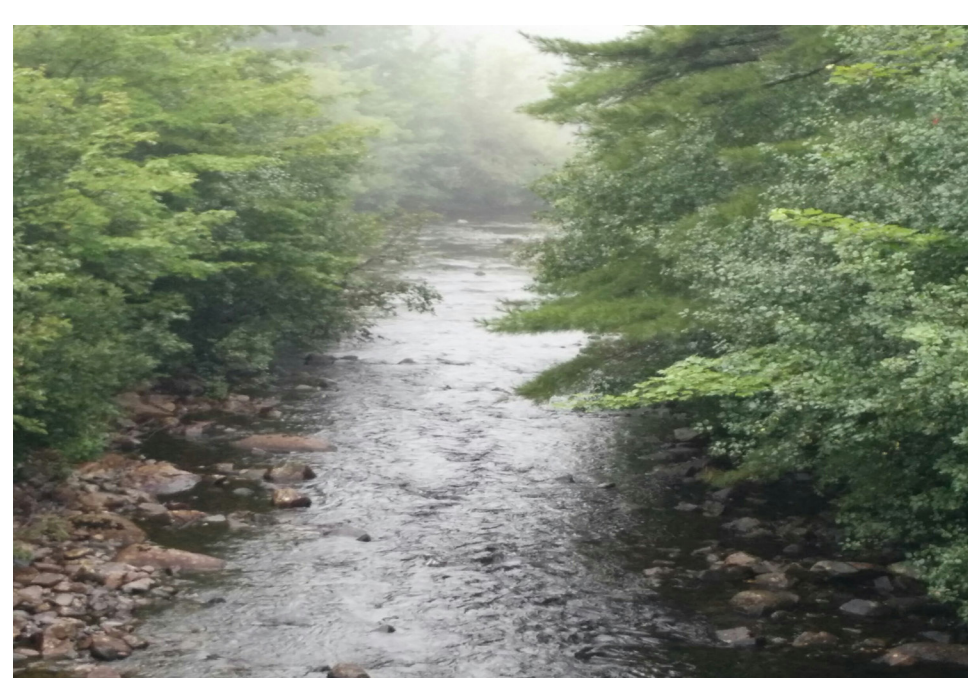
- The existing dam is a rock-filled timber crib structure and was built for a private milling operation in the late 1940's.
- Lake Major dam is reaching the end of its useful life and needs to be replaced.
- The timber fish ladder was taken out of service in 2015 and replaced with a fish pump for upstream migration and steel overflow chute for downstream migration.
- The existing rock-filled timber crib dam will be replaced with a concrete structure.
- Current water level in Lake Major is at an elevation of about 19.0 m. The new dam will allow for water levels of 19.5 m. This is slightly lower than the maximum historical water levels.



IMAGE OF DAM FROM BRIDGE  
Credit: Google Earth



DAM INSPECTION 2014



TYPICAL LOW FLOW  
DOWNSTREAM OF BRIDGE



ORIGINAL FISHWAY IN  
OPERATION



CURRENT CANOVAC FISH  
TRANSFER SYSTEM

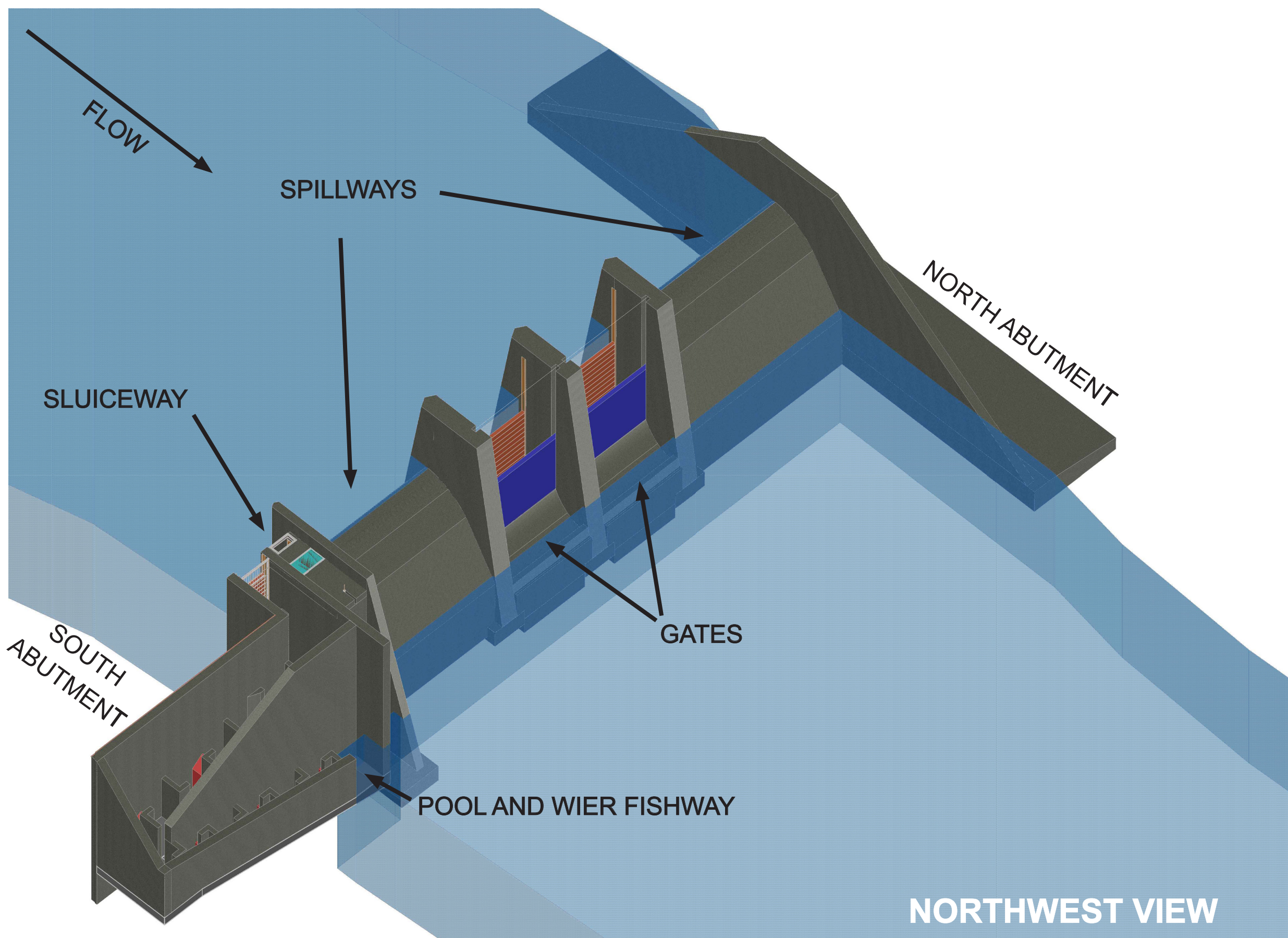


EXISTING SYSTEM ENCLOSURE AND  
SIPHON



# LAKE MAJOR DAM REPLACEMENT

## THE NEW DAM

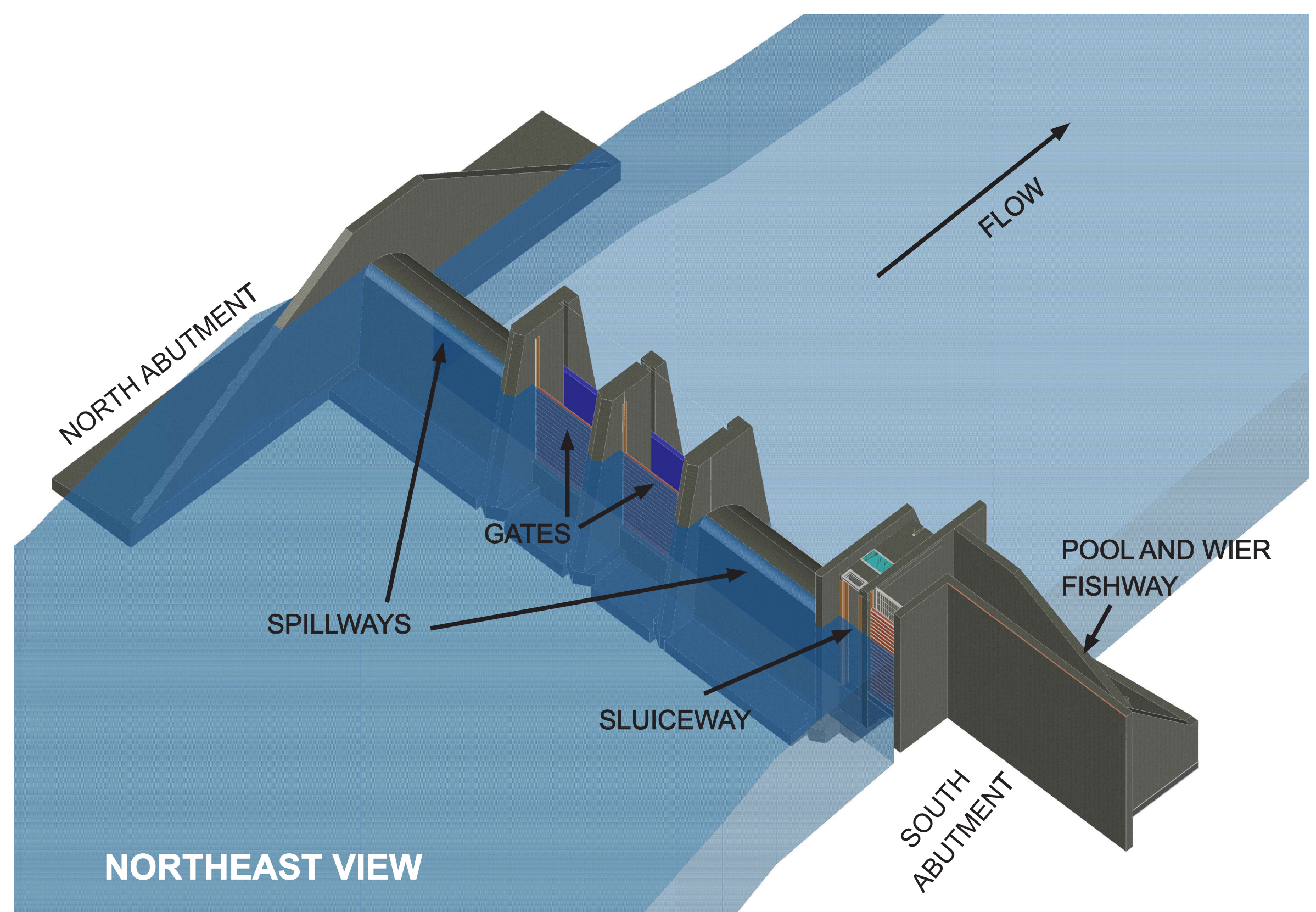


### THE DAM INCLUDES

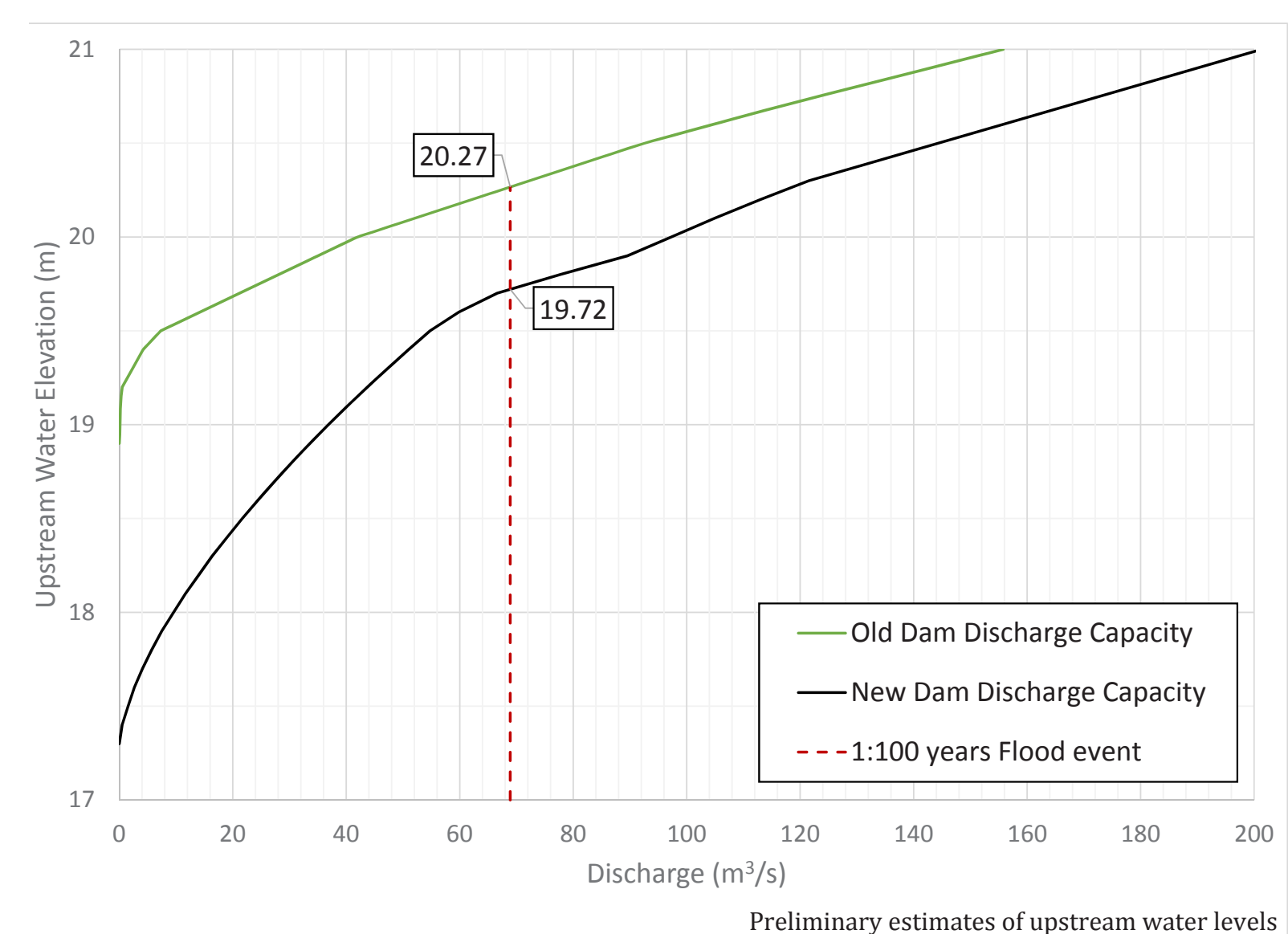
- The proposed new concrete structure will consist of:
  - 2 gates to help regulate flow over the dam;
  - 2 spillway sections to help mitigate flood risk;
  - A sluice gate to provide maintenance flows to support downstream aquatic life;
  - New “pool and weir” fishway (Fisheries and Oceans Canada approved) to support the migration of fish;
  - Retaining walls and earth filled abutments on each side.

### FEATURES

- The new dam will provide significantly more flexibility to manage water levels upstream and downstream of the dam.
- More storage in the reservoir to mitigate periods of drought.
- The fishway is designed in accordance with Department of Fisheries requirements and past studies to improve the fish migration past the Lake Major Dam.
- Provides more reliability and a longer life span (50+ years).
- Reduces flood related risks upstream and downstream of the dam.



EXAMPLE POOL AND WEIR FISH LADDER AT SANDY LAKE DAM

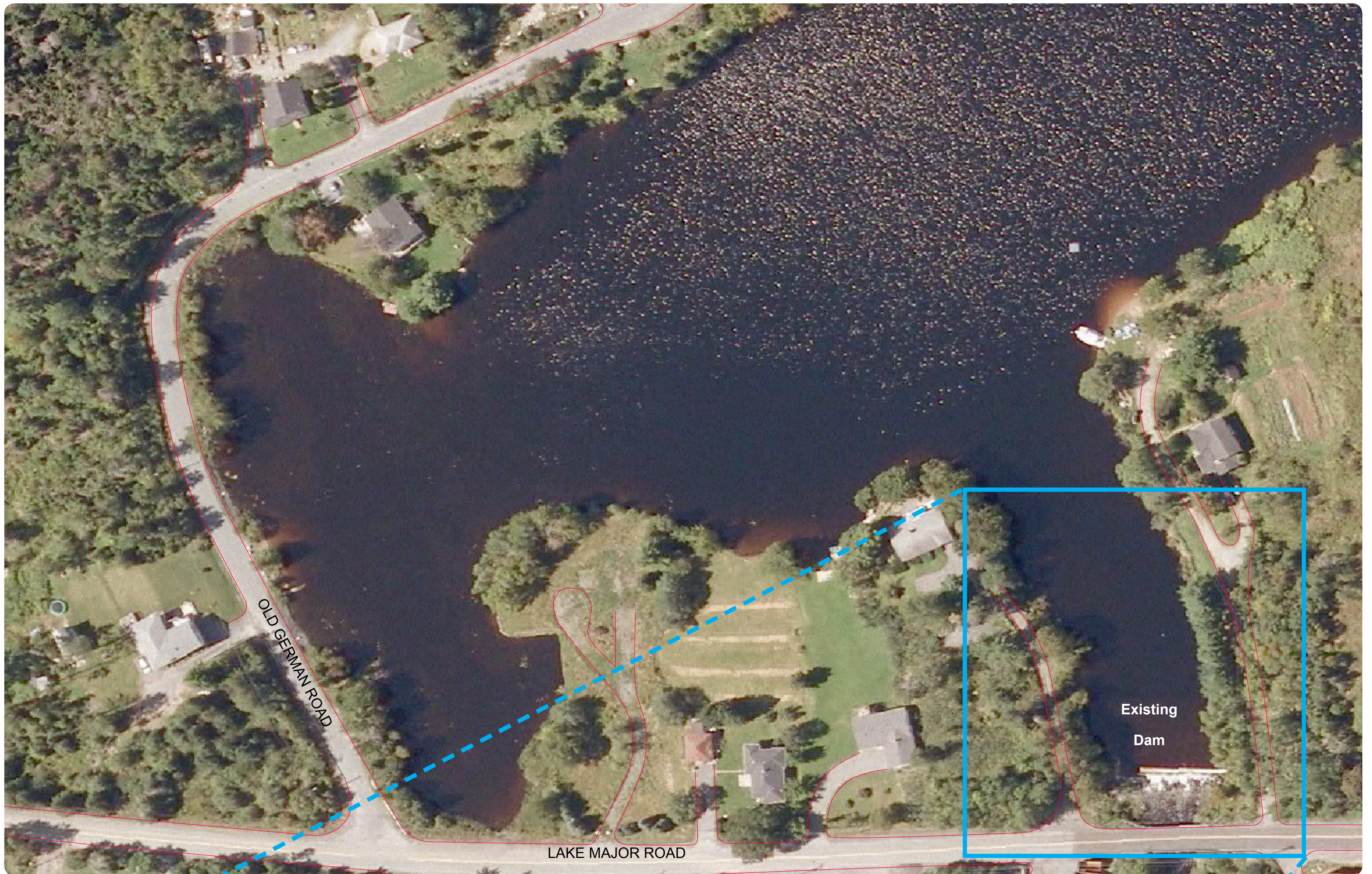


APPROXIMATE UPSTREAM WATER LEVELS FOR A 1:100 YEAR FLOOD EVENT



# LAKE MAJOR DAM REPLACEMENT

## NEW DAM LOCATION AND LAYOUT



These aerial views show the area of Lake Major in the immediate vicinity of the project.



Above, the existing dam can be seen at the bottom right hand side, adjacent to the bridge.

The image to the left shows the new dam location with fishway and a representation of how the new stream bed will look.



# LAKE MAJOR DAM REPLACEMENT

## ARCHAEOLOGY

### ARCHAEOLOGICAL SCREENING AND RECONNAISSANCE

*Archaeological screening* was completed by the CRM Group to investigate the potential for encountering archaeological materials in the area of the replacement dam.

Completed on behalf of *Halifax Water and the Special Places Program* (through a Heritage Research Permit) of the Nova Scotia Department of Communities, Culture and Heritage.

**The work included:**

- Archival research of land use history and ownership history including: Nova Scotia Archives, Department of Natural Resources, the Black Culture Centre for Nova Scotia and Crown Land Management Centre.
- Field reconnaissance, to conduct a visual inspection of the study area.
- Consideration of the environmental setting, water sources, topography, soils, vegetation and Native land use.
- Shovel testing of any potential impact areas was completed following the original study.

**Results:**

- The original study suggested an elevated potential for encountering precontact and/or early historic Native archaeological resources.
- Evidence of historical quarrying and milling was found.
- Very limited traces of European pottery were noted but not considered significant. Otherwise no archaeological resources were encountered.
- Recommendations will be made for the archeological clearance of all properties tested in the area of the dam.
- Further investigation will not likely be required unless construction excavation at the site reveals conditions contrary to the recently completed studies.



EVIDENCE OF HISTORICAL QUARRY



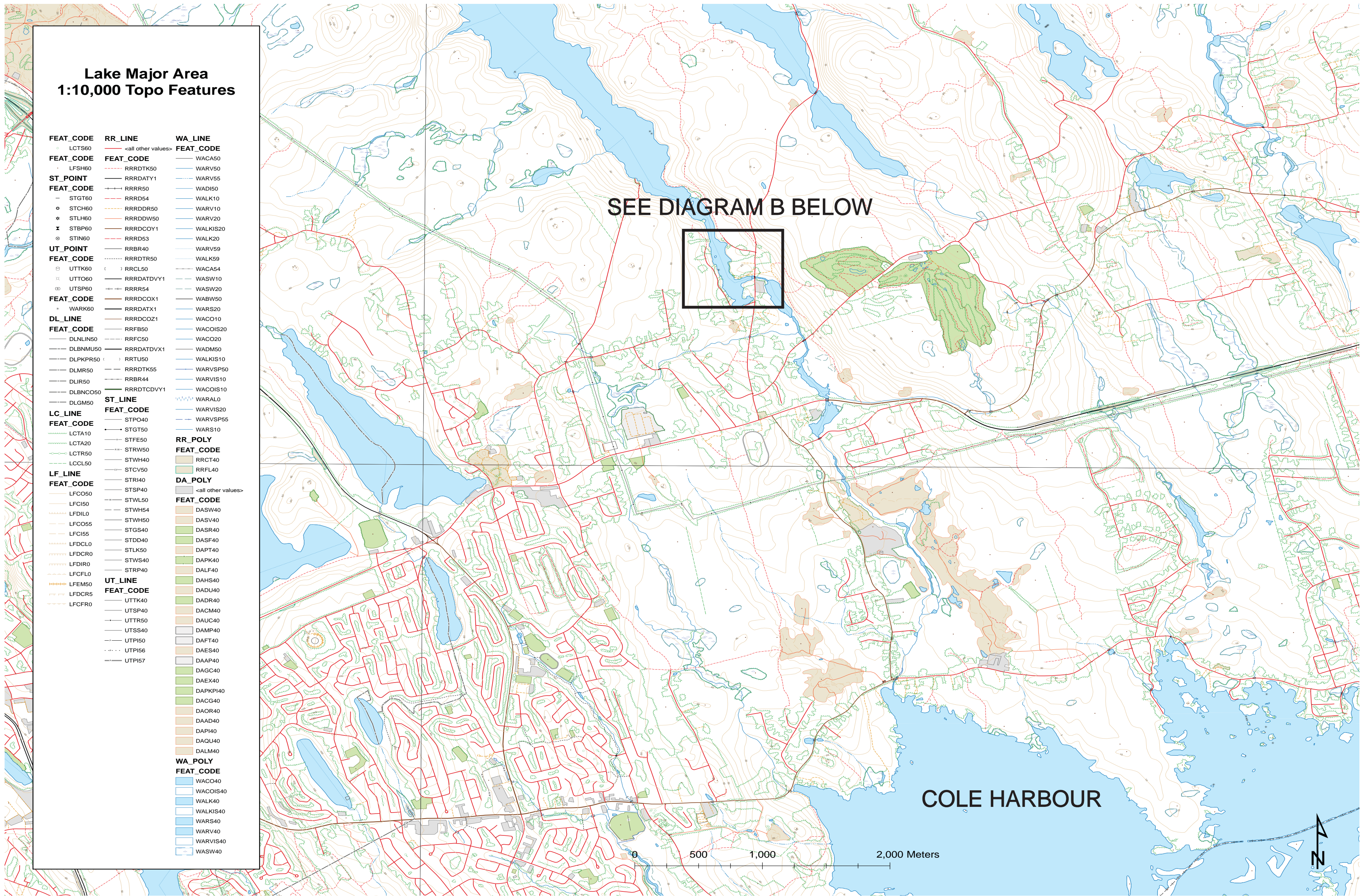
RECONNAISSANCE INCLUDED AREAS OF MODERN LAND USAGE



FIELD RECONNAISSANCE AT SHORELINE



## PROPERTY OWNERSHIP



The map above shows the topography surrounding Lake Major at a 1:10,000 scale. (Map provided by GeoNova, Nova Scotia Topographic Database).

Maps below show the properties surrounding Lake Major. As shown in the legend, the colors displayed on the maps denote different property ownership; privately owned, owned by Halifax Water or owned by the Province of Nova Scotia, NS Department of Natural Resources. All property ownerships information was taken as of October 21, 2015. (Map provided by viewpoint.ca and ownership information provided by Property Online, Access Nova Scotia).

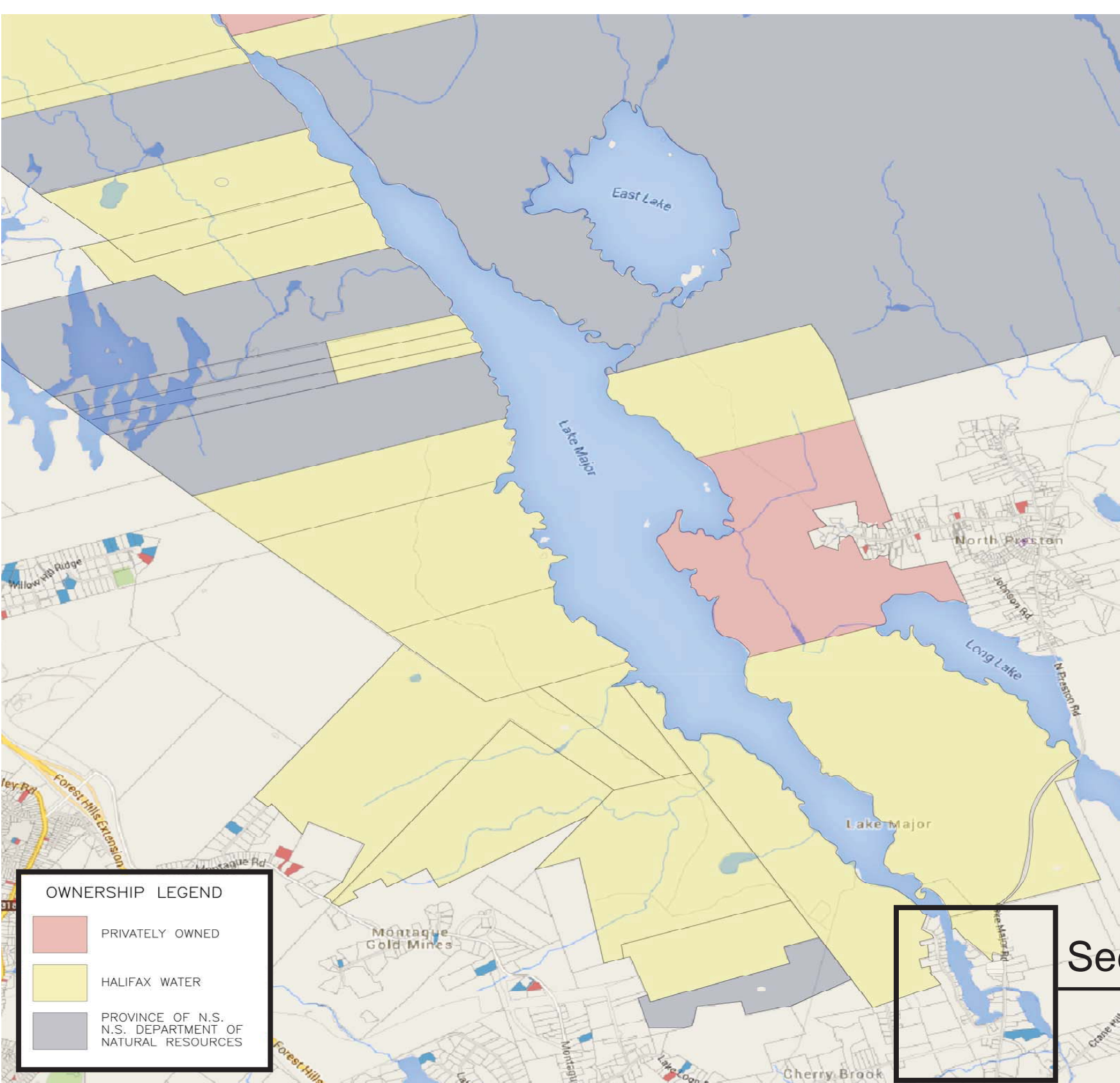


DIAGRAM A

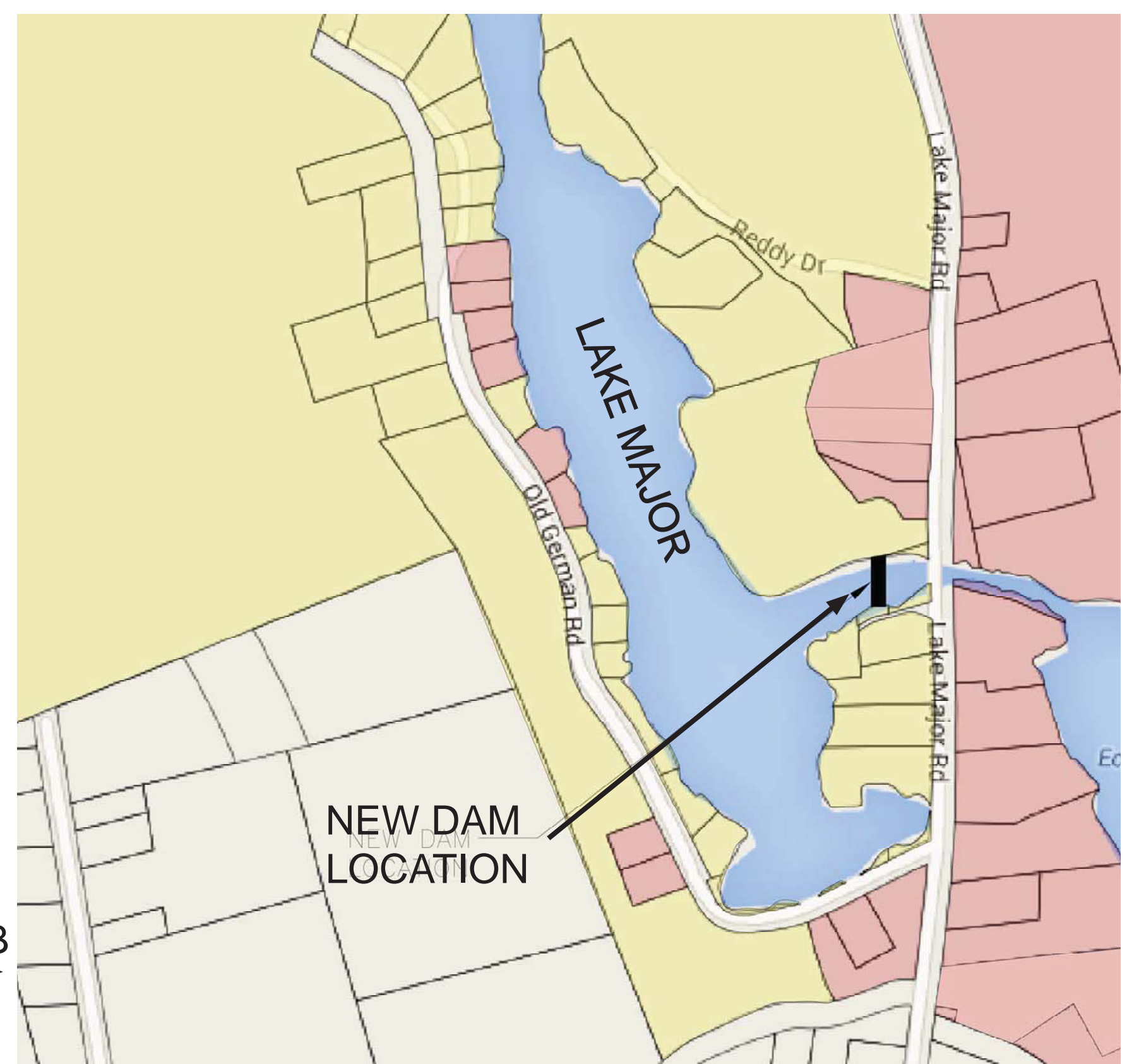


DIAGRAM B



## COMMITMENT TO ENGAGE

- We are committed to listening to and engaging the community.
- Community members will be involved in the project planning including:
  - ✓ Providing key information about the local area.
  - ✓ Helping develop a list of local businesses and services.
  - ✓ Identifying key concerns of the local users and stakeholders.
  - ✓ Provide feedback about the Project to Halifax Water and Lake Major Watershed Advisory Board.



### The Lake Major Watershed Advisory Board:

- ⇒ Providing key information about the local area.
- ⇒ Bring local ideas, concerns, and interests to the table.
- ⇒ Strengthens and enhances existing regulations and guidelines.
- ⇒ Represents landowners, residents, business-people, and community groups.





## ENVIRONMENT ASSESSMENT PROCESS

- Is required by Nova Scotia Environment to ensure that a project's environment and safety effects are minimized.
- Identifies environmental effects at an early stage in project development.
- Public consultation is an integral part of this process - community is invited to comment on the Environmental Assessment during the review period.
- Reviewed by Nova Scotia Environment and other relevant government agencies.
- Nova Scotia Minister of Environment only provides approval once satisfied that environmental and safety effects will be minimized.



## BASELINE STUDIES

- Avifauna (Birds)
- General Wildlife
- Plants
- Wetlands
- Watercourses and Fish Habitat
- Groundwater and Geology
- Visual Aesthetics
- Cultural and Heritage Resources
- Socio-economic Conditions